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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/736,147 | 12/15/2000 | Yasuo Kobayashi | 200669US0DIV | 9061 |

22850 7590 03/20/2002

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EXAMINER

DANG, THI D

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

1763

DATE MAILED: 03/20/2002

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/736,147

Applicant(s)

KOBAYASHI ET AL.

Examiner

Thi Dang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 16-31 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 16-31 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/086,574 and 09/437,500.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Moslehi* (5,403,434).

Moslehi discloses an apparatus for removing native oxide. This apparatus includes a remote plasma generator connected to a treatment chamber and a gas injector (22) for supplying an additional gas downstream of the remote plasma generator. A gas distribution system is also provided to supply different gases to the treatment chamber and to the plasma generator.

Moslehi also discloses means for supplying hydrogen gas and inert gas to the remote plasma generator and means for supplying halogen-containing gas (e.g. HF) to the treatment chamber (col. 10 lines 20-26; col. 11, lines 7-14). It is obvious that the non-plasma gas injector of *Moslehi*'s apparatus is capable of supplying any fluorinated gas including NF₃ because the gas injector is not limited to any particular halogen-containing gas.

Claims 16, 17, 19-22, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Mihara et al.* in view of *Lee*.

Mihara discloses an apparatus for ashing and etching that has all of the claimed structures (see Figs. 3 and 17B). *Mihara*'s apparatus includes: a plasma generating section (26); a treatment vessel (21); a temperature controller (29) that is composed of a heater and a chiller; and lifting pins (38) for holding the wafer in the heated state (col. 9, lines 19-40; col. 12, lines

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29-62). In *Mihara*'s apparatus, the heating means is located in the wafer holder and heating occurs when the wafer is held on the susceptor (28). Thus, the heating position in *Mihara*'s apparatus is not when the wafer is lifted by the lifting pins. *Lee* teaches to provide means for cooling and heating a wafer in the same chamber. A wafer supporting stage with cooling means provides cooling. Heating is performed by providing lamps above the wafer and a plurality of pins to lift the wafer above the wafer supporting stage during heating (col. 13, lines 5-22).

Therefore, it would have been obvious to substitute the heating means in *Mihara*'s apparatus with heating lamps arranged above the wafer because providing lamps to heat the wafer would be a conventional alternative to providing a heater in the wafer susceptor.

Claims 20-22 recite limitations relating to an intended use of the claimed apparatus, but they do not add any structural limitation that would define the claimed apparatus over that of prior art.

Claims 18, 23-25, 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Moslehi* (5,403,434) in view of *Lee*.

Moslehi's apparatus has most of the claimed structures, as discussed above. Even though Fig. 1 of *Moslehi* shows the wafer supporter holding the wafer face down, it would have been obvious to modify the reactor configuration so that the plasma and non-plasma gases are introduced above a wafer that is being held face up because *Moslehi*'s treatment is not dependent on the wafer being face down and is adaptable to other reactor configuration. *Moslehi*'s apparatus also includes a heating lamp for heating the substrate, but no cooling means. It would have been obvious to provide a susceptor with cooling means in *Moslehi*'s apparatus and lifting mechanism for supporting the wafer above the susceptor during heating because *Lee* teaches that

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it is conventional to provide both heating means and cooling means in the same chamber, and by adding the cooling means to *Moslehi*'s apparatus, it could be used for processing different steps.

Moslehi also discloses a cluster tool setup that includes the cleaning chamber discussed above and film forming chambers (Fig. 5; cols. 14-15).

Claims 30 and 31 recite limitations relating to an intended use of the claimed apparatus, but they do not add any structural limitation that would define the claimed apparatus over that of prior art.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-25, 28-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 23-25 recite the limitation "the NF3-gas supply section" but there is insufficient antecedent basis for this limitation in the claim.

Claims 28 and 29 fail to recite how the surface treatment apparatus recited in claim 16 is structurally related to the "cluster system."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: *Bersin*, *Kikuchi et al*, *Moslehi*, *Hayasaka et al* are cited to show related prior art.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thi Dang whose telephone number is (703) 308-1973. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

T.D.
March 17, 2002


THI DANG
PRIMARY EXAMINER
GROUP 1700